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EXAMINER	
FLORES, LEON	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/751,120	FRANK ET AL.
	Examiner	Art Unit
	Leon Flores	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 05 January 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-22 is/are rejected.

7)☒ Claim(s) 4,12 and 20 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 05 January 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 1/5/2004.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 4, 12 & 20 are objected to because of the following informalities:

Re claim 4, the word “predected” in line 16 should be rewritten as “predicted”.

Re claim 12, the word “symboles” in line 18 should be rewritten as “symbols”.

Re claim 20, it is not clear as to what the applicant is trying to contemplate by the limitation “being adapted to be operated”. For the purpose of art consideration on the merits, this limitation will be construed as either being coupled or capable of operating together on a PC board. Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-2 & 13 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 41 & 21-22 of U.S. Patent No. 7,106,709 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Re claim 1, A method for frequency correction in a multicarrier system, comprising: receiving a signal comprising a stream of data signals, calculating an estimated phase offset for each data signal as a function of thereof (In claim 41, ***"an estimated phase offset for each data symbol as a function of the data symbol"***), calculating a predicted phase offset for each data signal as a function of the estimated phase offset thereof and the estimated phase offset of a preceding one of the data signals (In claim 41, ***"a predicted phase offset for each data symbol as a function of the estimated phase offset thereof and an estimated phase offset of a preceeding one of the data symbols in the stream"***), and correcting the received signal by correcting a phase of each data signal as a function of the predicted phase offset thereof.(In claim 41, ***"a timing correction unit which performs in the frequency domain a timing drift compensation between the transmitter sample clock and the receiver sample clock."***)

Re claim 2, The method according to claim 1, comprising: calculating the predicted phase offset further as a function of the predicted phase offset of the preceding one of the data signals (In claim 21,***"a predicted phase offset for each data symbol as a function of the estimated phase offset thereof and an estimated***

phase offset of a preceeding one of the data symbols in the stream") or calculating the predicted phase offset further as a function of the predicted phase offset of the preceding one of the data signals and the predicted phase offset of one of the data signals preceding the preceding one of the data signals.

Re claim 13, An apparatus for frequency correction in a multi-carrier system, comprising: receiving means for receiving a signal comprising a stream of data signals, a frequency correction means for frequency correction of each data signal in response to a corresponding predicted phase offset. (In claim 21, ***"a timing correction unit which performs in the frequency domain a timing drift compensation between the transmitter sample clock and the receiver sample clock."***), and a phase locked loop means for generating the predicted phase offsets (In claim 22, ***"a phase locked loop for generating the predicted phase offset"***), comprising a phase discrimination means for generating an estimated phase offset for each data signal as a function thereof (In claim 22, ***"a phase discrimination unit for generating an estimated phase offset for each data signal as a function thereof"***), a filter means for receiving estimates phase offsets and generating the predicted phase offset for each data signal as a function of the estimated phase offset thereof and the estimated phase offset of a preceding one of the data signals. (In claim 22, ***"a filter for receiving estimated phase offsets and generating the predicted phase offset for each data symbols as a function of the estimated phase offset thereof and the estimated phase offset of a preceding one of the data symbols."***)

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims (1-5, 8, 11-14, 16-17, & 19-22) are rejected under 35 U.S.C. 102(b) as being anticipated by Bingham (US Patent 5,228,062).

Re claim 1, Bingham discloses a method for frequency correction in a multi-carrier system (see abstract & col. 2, lines 64-68.), comprising: receiving a signal comprising a stream of data signals (see Fig. 2: element 10), calculating an estimated phase offset for each data signal as a function of thereof (see col. 3, lines 10-17), calculating a predicted phase offset for each data signal as a function of the estimated phase offset thereof and the estimated phase offset of a preceding one of the data signals (see col. 3, lines 19-20 & 41-57), and correcting the received signal by correcting a phase of each data signal as a function of the predicted phase offset thereof. (see col. 3, lines 41-44)

Re claim 2, Bingham discloses the method according to claim 1, comprising: calculating the predicted phase offset further as a function of the predicted phase offset of the preceding one of the data signals (see col. 3, lines 54-57), **<u>or</u>** calculating the

predicted phase offset further as a function of the predicted phase offset of the preceding one of the data signals and the predicted phase offset of one of the data signals preceding the preceding one of the data signals.

Re claim 3, Bingham discloses the method according to claim 1, comprising: calculating a phase correction offset for each data signal as a function of the predicted phase offset of the preceding one of the data signals (see col. 3, lines 41-44 & 54-57), and correcting each data signal as a function of the phase correction offset thereof. (See col. 3, lines 54-57)

Re claim 4, Bingham further discloses that, comprising: separating each data signal in at least two data signal samples (see Fig. 2: element 10), calculating a predicted sample phase offset for each of said data signal samples as a function of the predicted phase offset of a corresponding one of the data signals (see Fig. 2: element 240 & 250. For each signal sample a sample phase offset has been calculated.), and correcting the phase of each data signal further by correcting a phase of each of the data signal samples as a function of a respective one of the predected sample phase offsets. (See Fig. 2: element 260)

Re claim 5, Bingham further discloses that, comprising: separating each data signal such that a first of the data signal samples represents the beginning of the

corresponding one of the data signals. (It is inherent that there is a sampling time associated with each sampled signal.)

Re claim 8, Bingham discloses the method of claim 1, comprising: receiving a preamble signal preceding the data signals (see Fig. 2: training), calculating an estimated phase arc as a function of the preamble signal (see Fig. 2: elements 75 & 80), and calculating the estimated phase offset of the data signal subsequent the preamble signal as a function thereof and the estimated phase arc. (See Fig. 2: element 190)

Re claim 11, Bingham further discloses that, comprising: separating each data signal in the data signal samples by means of sampling the received signal or each data signal. (See Fig. 2: element 10)

Re claim 12, Bingham discloses the method according to claim1, comprising: receiving an orthogonal frequency division multiplex (OFDM) signal as the received signal (multi-carrier signals), wherein a stream of symboles thereof represent the stream of data signals (see Fig. 2: data), and at least one preamble symbol thereof represent the preamble signal.(see Fig. 2: training)

Claim 13 is a system claim corresponding to method claim 1. Hence, the steps in method claim 1 would have necessitated the system elements as claimed.

Therefore, claim 13 has been analyzed and rejected in view of claim 1 above.

Re claim 14, Bingham further discloses that characterized by: the filter means comprising a first order loop filter means (see Fig. 2: elements 220 & 230) for receiving the estimated phase offsets and an integrator (see Fig. 2: elements 100 & 105, which are called sine-wave generators. One skill in the art would know that sine-wave generator are also called Voltage-Controlled Oscillators (VCO), and these Oscillators can be thought as integrators too. This is illustrated by John G. Proakis, "Digital Communications, 4th edition. Page 342, figure 6.2-4.) for receiving outputs of the first order loop filter means.

Claim 16 is system claim corresponding to the method claim 4 above. Hence, Hence, the steps in method claim 16 would have necessitated the system elements as claimed. Therefore, claim 16 has been analyzed and rejected in view of claim 4 above.

Re claim 17, Bingham further discloses that characterized by: the calculation means being coupled to the filter means. (see Fig. 2: elements 240 & 250 are coupled to elements 220 & 230 respectively)

Re claim 19, Bingham further discloses that characterized by: the frequency correction (see Fig. 2: element 260) means being coupled to the filter means (see Fig.

2: elements 220 & 230) and the calculation means. (See Fig. 2: element 85)

Re claim 20, Bingham further discloses that characterized by: the frequency correction means and the filter means being adapted to be operated. (See Fig. 2)

Claim 21 has been analyzed and rejected in view of claim 22 below.

Re claim 22, Bingham discloses a transceiver for wireless communication, characterized by being adapted to be operated by the method according to claim 1. (See abstract)

Claims 1-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Davidsson et al. (US Publication 2002/0101840 A1)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Re claim 1, Davidsson et al disclose a method for frequency correction in a multicarrier system (see Fig. 7: element 104), comprising: receiving a signal comprising

a stream of data signals (see Fig. 7: 48), calculating an estimated phase offset for each data signal as a function of thereof (see Fig. 8: the output of element 166), calculating a predicted phase offset for each data signal as a function of the estimated phase offset thereof and the estimated phase offset of a preceding one of the data signals (see Fig. 8: the output of element 170), and correcting the received signal by correcting a phase of each data signal as a function of the predicted phase offset thereof (see Fig. 7: element 100(7) & paragraph 86. The output of element 176, which is the frequency offset, is related to the timing drift by equation 63. And the predicted phase is related to the frequency offset by equation 17.)

Re claim 2, Davidsson et al further disclose that, comprising: calculating the predicted phase offset further as a function of the predicted phase offset of the preceding one of the data signals (see Fig. 8 & paragraphs 84-86), **<u>or</u>** calculating the predicted phase offset further as a function of the predicted phase offset of the preceding one of the data signals and the predicted phase offset of one of the data signals preceding the preceding one of the data signals. (See Fig. 8)

Re claim 3, Davidsson et al further disclose that, comprising: calculating a phase correction offset for each data signal as a function of the predicted phase offset of the preceding one of the data signals (see Fig. 2 & 8), and correcting each data signal as a function of the phase correction offset thereof. (See Fig. 2 & 8)

Re claim 4, Davidsson et al further disclose that, comprising: separating each data signal in at least two data signal samples (see Fig. 8: element 174), calculating a predicted sample phase offset for each of said data signal samples as a function of the predicted phase offset of a corresponding one of the data signals (see Fig. 8: the output of element 174), and correcting the phase of each data signal further by correcting a phase of each of the data signal samples as a function of a respective one of the predected sample phase offsets. (See Fig. 8: the output of element 176 is transmitted to the timing correction unit where the timing drift is calculated. See claim 1 for details.)

Re claim 5, Davidsson further discloses that, comprising: separating each data signal such that a first of the data signal samples represents the beginning of the corresponding one of the data signals. (See Fig. 8: element 174)

Re claim 6, Davidsson et al further disclose that, comprising: calculating a sample phase correction offset for each of the data signal samples as a function of the predicted sample phase offset and the predicted phase offset of the corresponding one of the data signal (see paragraph 94), and correcting the phase of each data signal by correcting the phase of each of the data signal samples thereof as a function of a corresponding one of the phase correction offsets and a corresponding one of the sample phase correction offsets. (See paragraph 94-96 & 86.)

Re claim 7, Davidsson et al further disclose that, comprising: calculating each predicted sample offset as a function of the predicted phase offset of the corresponding one of the data signals and a measure being indicative of a distance between a main phase reference point for the received signal and a phase reference point for the preceding one of the data signals. (See Fig. 2 & paragraphs 93 & 94.)

Re claim 8, Davidsson et al further disclose that, comprising: receiving a preamble signal preceding the data signals (see Fig. 2: training symbol), calculating an estimated phase arc as a function of the preamble signal (see paragraphs 90-92 & Fig. 7 & 8.), and calculating the estimated phase offset of the data signal subsequent the preamble signal as a function thereof and the estimated phase arc. (See paragraphs 90-94 & Fig. 7 & 8.)

Re claim 9, Davidsson et al further disclose that, comprising: defining the main phase reference point to be indicative of the middle of the preamble signal in the time domain, (see paragraph 87) **and/or** defining the phase reference points to be indicative of the beginning of the corresponding data signal in the time domain. (See paragraph 88 & 92)

Re claim 10, Davidsson et al further disclose that, comprising: defining a phase reference point for the data signal subsequent the preamble signal to be indicative of

the middle of the subsequent data signal in the time domain. (See Fig. 2 & paragraphs 87 & 88.)

Re claim 11, Davidsson et al further disclose that, comprising: separating each data signal in the data signal samples by means of sampling the received signal or each data signal. (See Fig. 8: element 174)

Re claim 12, Davidsson et al further disclose that, comprising: receiving an orthogonal frequency division multiplex (OFDM) signal as the received signal, wherein a stream of symboles thereof represent the stream of data signals, and at least one preamble symbol thereof represent the preamble signal. (See abstract & Fig. 2)

Claim 13 is a system claim corresponding to method claim 1. Hence, the steps in method claim 1 would have necessitated the system elements as claimed. Therefore, claim 13 has been analyzed and rejected in view of claim 1 above.

Re claim 14, Davidsson et al further disclose that characterized by: the filter means comprising a first order loop filter means (see Fig. 8: 168) for receiving the estimated phase offsets and an integrator (see Fig. 8: 170) for receiving outputs of the first order loop filter means.

Claim 16 is system claim corresponding to the method claim 4 above. Hence, Hence, the steps in method claim 16 would have necessitated the system elements as claimed. Therefore, claim 16 has been analyzed and rejected in view of claim 4 above.

Re claim 17, Davidsson et al further discloses that characterized by: the calculation means being coupled to the filter means. (See Fig. 8: 174)

Re claim 19, Davidsson et al further discloses that characterized by: the frequency correction means being coupled to the filter means and the calculation means.(see Fig. 7 & 8)

Re claim 20, Davidsson et al further discloses that characterized by: the frequency correction means and the filter means being adapted to be operated. (See Fig. 7 & 8)

Claim 21 has been analyzed and rejected in view of claim 22 below.

Re claim 22, Davidsson et al discloses a transceiver for wireless communication, characterized by being adapted to be operated by the method according to claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 15 & 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bingham (US Patent 5,228,062), as applied to claim 13, and in view of John G. Proakis "Digital Communications" 4th edtion, Published August 2000.

Re claim 15, Bingham discloses the apparatus according to claim 14, but fails to specifically disclose that, characterized by: a delay means for receiving outputs of the integrator. However, John G. Proakis does. (See chapter 6: "Carrier and Symbol Synchronization", Figure 6.2-10). John G. Proakis discloses a way for dealing with carrier synchronization at the receiver by employing a phase-lock loop (PLL) to acquire and track the carrier component. One skilled in the art would know that a VCO can be

depicted as an integrator, and figure 6.2-10 clearly shows that the delay unit is operably coupled to the VCO unit.

Taking the combined teachings of Bingham and John G. Proakis as a whole, it would have been obvious to one of ordinary skill in the art to have incorporated the delay device in the manner as claimed, as taught by Proakis, for the benefit of obtaining a carrier phase estimation in the system of Bingham.

Re claim 18, the combination of Bingham and Proakis disclose that, characterizes by: the calculation means being coupled to the delay means. (In Proakis, see chapter 6: Figure 6.2-10)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Flores whose telephone number is 571-270-1201. The examiner can normally be reached on Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LF
December 4, 2006

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER